

PATENT ABSTRACTS OF JAPAN

(11)Publication number : 09-298517

(43)Date of publication of application : 18.11.1997

(51)Int.Cl.

H04H 7/00
G10K 15/00
H03F 3/181
H03G 9/00

(21)Application number : 08-134381

(71)Applicant : TOA CORP

(22)Date of filing : 30.04.1996

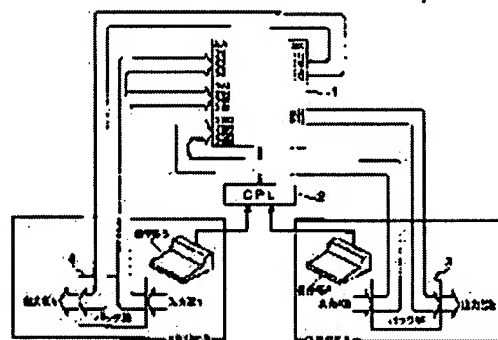
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(54) AUDIO MIXER

(57)Abstract:

PROBLEM TO BE SOLVED: To allow a mixer to effectively use all input output channels of a signal processing section.

SOLUTION: A signal processing section 1 having input 256-channel and output 32-channel is provided with two operation sections A, B. For example, input channels Ch253-Ch256 and output channels Ch31-Ch32 are assigned to the operation section A among the input and output channels. On the other hand, e.g. input channels Ch1-Ch4 and Ch33-Ch36 and output channels Ch1-Ch4 are respectively assigned to the operation section A, different channels from the input output channels assigned to the operation section A. Then the operations A, B control the assigned input output channels in an independent state.



LEGAL STATUS

[Date of request for examination] 13.09.2002

[Date of sending the examiner's decision of] 24.01.2006

rejection]

[Kind of final disposal of application other than
the examiner's decision of rejection or
application converted registration]

[Date of final disposal for application]

[Patent number] 3811219

[Date of registration] 02.06.2006

[Number of appeal against examiner's
decision of rejection] 2006-003348

[Date of requesting appeal against examiner's
decision of rejection] 23.02.2006

[Date of extinction of right]

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CLAIMS

[Claim(s)]

[Claim 1] Two or more input channels, two or more output channels, and two or more signal-processing units that process the audio signal which is prepared for each [these] input/output channel of every, and is transmitted in each according to signal-processing information, The connecting means which connects between the signal-processing units of these plurality according to an initial entry, respectively, Control of processing of each above-mentioned signal-processing unit different, respectively from a preparation ***** means is assigned. The handler for signal-processing control which generates the above-mentioned signal-processing information which controls processing of each above-mentioned signal-processing unit assigned to each according to an actuation condition, The audio mixer characterized by providing two or more control units equipped with the handler for connection control which generates the above-mentioned initial entry which controls connection between each above-mentioned signal-processing unit assigned to each according to an actuation condition.

[Claim 2] It is the audio mixer characterized by it being presupposed by only the handler for the above-mentioned connection control with which the control unit of the above-mentioned identitas was equipped that it is controllable in an audio mixer according to claim 1 about connection between each above-mentioned signal-processing unit assigned to the respectively same control unit.

[Claim 3] It is the audio mixer characterized by to be supposed that it is controllable in a condition connectable [with the handler for the above-mentioned connection control with which the above-mentioned control unit to which control of processing of this signal-processing unit is assigned about the signal-processing unit prepared in the above-mentioned output channel in the audio mixer according to claim 1 or 2 among each above-mentioned signal-processing unit assigned to each above-mentioned control unit was equipped] with the signal-processing unit prepared in which input channel at arbitration.

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DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[Field of the Invention] Especially this invention relates to what has the signal-processing section which constitutes an audio mixer, and the control unit which controls this in the condition of having become independent, respectively about an audio mixer.

[0002]

[Description of the Prior Art] There is a thing as shown in drawing 4 as an audio mixer with which the signal-processing section and a control unit consist of conditions of having become independent, respectively, as mentioned above conventionally. That is, 1 in this drawing minds the signal-processing section, 100 minds a control cable 200 by the control unit, and these signal-processing section 1 and a control unit 100 are connected mutually.

[0003] The internal configuration of the above-mentioned signal-processing section 1 is shown in drawing 5. This signal-processing section 1 is constituted by DSP (digital-signal-processing equipment), and as shown in this drawing (a), it has two or more input/output channels, for example, 256 input channels, and 32 output channels. And the signal-processing unit 11 for adjusting the acoustic feature of the audio signal transmitted in each to each input/output channel is formed. In addition, this signal-processing unit 11 is constituted by the filter 12 for adjusting the frequency characteristics of the above-mentioned audio signal, and the fader 13 for adjusting signal level.

[0004] moreover -- the part with which each input/output channel is divided into a row and column, respectively, and forms the matrix and which each input/output channel intersects -- this drawing (b) -- (-- as shown in this drawing (drawing which expanded the part 14 surrounded by the dotted line in a)), the connecting means 15 which switches between each input/output channel (between the signal-processing units prepared in each input/output channel in detail) to connection or a connectionless condition, respectively, for example, a switching circuit, is established. That is, by carrying out ON/OFF of each [these] switching circuit 15 to arbitration, the audio signal inputted from each above-mentioned input channel can be mixed and distributed to arbitration, and it can output to each above-mentioned output channel.

[0005] On the other hand, the control unit 100 which controls the above-mentioned signal-processing section 1 is equipped with two or more input channel modules 101 and two or more output channel modules 102 as shown in drawing 4. And control of each signal-processing unit 11 (namely, a filter 12 and a fader 13) prepared in each input/output channel of the above-mentioned signal-processing section 1 is assigned to each [these] modules 101 and 102, respectively. That is, the slide knob 104 grade for adjusting the revolution knob 103 for adjusting the frequency characteristics of the above-mentioned filter 12 and the level of the above-mentioned fader 13 to each modules 101 and 102 is prepared. If these knobs 103 and 104 are operated, it will be sent to CPU (central operation processor: not shown) which has a manipulate signal according to this in this control unit 100, and CPU will transmit the control signal according to the above-mentioned manipulate signal to the signal-processing section 1 through a control cable 200. And each filter 12 and each fader 13 corresponding to each above-mentioned knobs

103 and 104 are controlled [in the signal-processing section 1] according to the signal-processing information according to the actuation condition of each above-mentioned knobs 103 and 104 according to the above-mentioned control signal. Thereby, adjustment of the frequency characteristics of the audio signal transmitted in each input/output channel and signal level is realized.

[0006] In addition, it can set up freely whether each above-mentioned input channel module 101 assigns control of processing of the signal-processing unit 11 which does not correspond fixed to each signal-processing unit 11 prepared in each input channel of the signal-processing section 1, respectively, receives which input channel module 101, and was prepared in the input channel of a gap. And control of processing of two or more signal-processing units 11 prepared in two or more input channels, respectively can also be assigned to one input channel module 101, and, thereby, two or more above-mentioned signal-processing units 11 can be controlled by actuation of one input channel module 101 all at once. In addition, about this quota control, it is also the same as when assigning each signal-processing unit 11 of each output channel to each output channel module 102. Moreover, the assignment of each signal-processing unit 11 to each [these] modules 101 and 102 is controlled by the key input from the handler for allocation control which is prepared in the control unit 100 and which is not illustrated, for example, a keyboard.

[0007] and ON/OFF control of each switching circuit 15 prepared between each input/output channel in the signal-processing section 1 (between the signal-processing units 11 of each input/output channel) -- getting it blocked -- it is controlled by the control unit 100 also about how between each signal-processing unit 11 is connected. That is, the handler, for example, a keyboard, a touch display, etc. which is not illustrated, for each switching circuit 15 above-mentioned control etc. are prepared in the control unit 100. If this keyboard or a touch display is operated, it will be sent to CPU which the manipulate signal according to this mentioned above, and CPU will transmit the control signal according to this manipulate signal to the signal-processing section 1 through a control cable 200. And according to the above-mentioned control signal, ON/OFF control of each above-mentioned switching circuit 15 is carried out [in the signal-processing section 1] according to the so-called initial entry according to the actuation condition of the above-mentioned keyboard or a touch display. And according to ON/OFF control of each of this switching circuit 15, the audio signal inputted from each input channel will be mixed and distributed, and will be outputted to each output channel.

[0008]

[Problem(s) to be Solved by the Invention] The so-called multi-channel type which has the above numbers of input channels of no less than 256 channels and the number of output channels of no less than 32 channels of audio mixer is installed in the place which does a complicated very large-scale and acoustic control activity like a broadcasting station or recording studio. However, in the usual acoustic control activity, it is dramatically rare to need such a number of input channels of no less than 256 channels and the number of output channels of no less than 32 channels (namely, thing handling the input signal of 256, and the output signal of 32), and in almost all cases, 32 thru/or 64 channels, and an output channel can fully cope with it, if the number of input channels has 4 thru/or no less than eight channels. Therefore, when it is a superfluous specification and this audio mixer is used for the usual acoustic control activity to the usual acoustic control activity, the above-mentioned audio mixer will be in the condition (it played) that very many input/output channels are not used, and will have the problem of being very uneconomical. so that the number of input/output channels of an audio mixer [especially] increases -- being expensive (high-class) -- since it becomes, it is dramatically useless to keep many input/output channels idle as mentioned above.

[0009] This invention aims at offering the audio mixer which can be used effectively by making controllable independently each above-mentioned input/output channel which prepared two or more control units, and assigned an input/output channel which is different in each [these] control unit, respectively according to the individual, and the above signal-processing sections 1 of a multi-channel mold were assigned by each control unit at each, without keeping each above-mentioned input/output channel idle as much as possible.

[0010]

[Means for Solving the Problem] In order to attain the object mentioned above, among this inventions invention according to claim 1 Two or more input channels, two or more output channels, and two or more signal-processing units that process the audio signal which is prepared for each [these] input/output channel of every, and is transmitted in each according to signal-processing information, The connecting means which connects between the signal-processing units of these plurality according to an initial entry, respectively, Control of processing of each above-mentioned signal-processing unit different, respectively from a preparation ***** means is assigned. The handler for signal-processing control which generates the above-mentioned signal-processing information which controls processing of each above-mentioned signal-processing unit assigned to each according to an actuation condition, It is characterized by providing two or more control units equipped with the handler for connection control which generates the above-mentioned initial entry which controls connection between each above-mentioned signal-processing unit assigned to each according to an actuation condition.

[0011] That is, to one signal-processing means, two or more control units are prepared and control of processing of the signal-processing unit prepared in an input/output channel which is different, respectively among two or more input/output channels which the above-mentioned signal-processing means has is assigned to each [these] control unit. If the handler for signal-processing control with which each control unit was equipped is operated, according to this actuation condition, the signal-processing (it corresponds) unit assigned to this operated control unit will be controlled, and the audio signal transmitted in the input/output channel assigned to the above-mentioned control unit by this will be processed. Processing of this audio signal is not controlled by any control units other than the above-mentioned control unit assigned to this (namely, other control units). Moreover, if the handler for connection control with which each control unit was equipped is operated, according to this actuation condition, between the signal-processing units of each (it corresponds) input/output channel assigned to this operated control unit will be connected, and it will be outputted to the output channel by which the audio signal transmitted in the input channel assigned to the above-mentioned control unit by this was mixed and distributed, and was assigned to the above-mentioned control unit.

[0012] Invention according to claim 2 is characterized by it being presupposed by only the handler for the above-mentioned connection control with which the control unit of the above-mentioned identitas was equipped that it is controllable in an audio mixer according to claim 1 about connection between each above-mentioned signal-processing unit assigned to the respectively same control unit.

[0013] That is, about connection between each signal-processing unit assigned to a certain control unit, it is not controlled by other control units.

[0014] Invention according to claim 3 is set to an audio mixer according to claim 1 or 2. About the signal-processing unit prepared in the above-mentioned output channel among each above-mentioned signal-processing unit assigned to each above-mentioned control unit It is characterized by supposing that it is controllable in the condition connectable [with the handler for the above-mentioned connection control with which the above-mentioned control unit to which control of processing of this signal-processing unit is assigned was equipped] with the signal-processing unit prepared in which input channel at arbitration.

[0015] That is, the audio signal inputted from all input channels to the output channel which has the signal-processing unit assigned to this control unit of a certain by actuation of the handler for connection control prepared in a certain control unit can be made to distribute to arbitration (output). In addition, about distribution of this audio signal, it is uncontrollable depending on other control units.

[0016]

[Embodiment of the Invention] About the gestalt of operation of the audio mixer concerning this invention, the example is explained with reference to drawing 3 from drawing 1 . Drawing 1 is the block diagram showing the outline configuration of the whole audio mixer concerning the gestalt of this operation. As shown in this drawing, to one set of the signal-processing section 1, this audio mixer connects Plurality (two sets of for example, control units) A and B according to an individual through a control section 2, for example, CPU, respectively, and it constitutes them so that the above-mentioned

signal-processing section 1 may be controlled by each control units A and B. In addition, since it is equivalent to the thing of the conventional technique shown in drawing 5 which the internal configuration mentioned above about the above-mentioned signal-processing section 1 as shown in drawing 2, in the gestalt of this operation, the detailed explanation about the structure of the above-mentioned signal-processing section 1 is omitted.

[0017] namely, each control units A and B like the conventional control unit 100 shown in drawing 4 mentioned above Two or more input channel module and two or more output channel modules (to each [these] module) for adjusting each signal-processing unit 11 (each filter 12 and each fader 13) of the above-mentioned signal-processing section 1, respectively which are not illustrated the revolution knob for adjusting the frequency characteristics of the above-mentioned filter 12, the slide knob (neither is illustrated) for adjusting the level of the above-mentioned fader 13, etc. are formed. It has. However, an input/output channel which is different, respectively among two or more input/output channels which the signal-processing section 1 has is assigned to each [these] control units A and B. To a control unit A, for example, an input channel Ch253 thru/or four input channels of Ch256, output channels Ch31, or two output channels of Ch32 On the other hand, an input channel Ch1 Ch4 and Ch33 thru/or a total of eight input channels of Ch36, output channels Ch1, or four output channels of Ch4 are assigned to the control unit B, respectively.

[0018] And control of each signal-processing unit 11 of each input/output channel assigned to each above-mentioned control units A and B, respectively is further assigned to each module of each control units A and B.

[0019] namely, to each input channel module of a control unit A Control of processing of the signal-processing unit (each signal-processing unit surrounded by the dotted line 16 in drawing 2) 11 prepared in an input channel Ch253 thru/or four input channels of Ch256, respectively Moreover, control of processing of the signal-processing unit (each signal-processing unit surrounded by the dotted line 17 in drawing 2) 11 prepared in an output channel Ch31 thru/or two output channels of Ch32, respectively is assigned to each output channel module, respectively. Therefore, if each above-mentioned knob formed in each [these] module is operated, the manipulate signal according to this will be sent to CPU2, and CPU2 will transmit the control signal according to the above-mentioned manipulate signal to the signal-processing section 1. And the thing corresponding to each above-mentioned knob is controlled according to the signal-processing information according to the actuation condition of each above-mentioned knob according to the above-mentioned control signal among the signal-processing units 11 surrounded by the above-mentioned each point lines 16 and 17 in the signal-processing section 1. In addition, about the signal-processing unit 11 surrounded by the above-mentioned each point lines 16 and 17, only with each module of a control unit A, it is controllable and control by other control units B, i.e., a control unit, is made impossible.

[0020] On the other hand, to each input channel module of a control unit B Control of processing of the signal-processing unit (each signal-processing unit surrounded by dotted lines 18 and 19 in drawing 2) 11 prepared in an input channel Ch1 Ch4 and Ch33 thru/or a total of eight input channels of Ch36, respectively Moreover, control of processing of the signal-processing unit (each signal-processing unit surrounded by the dotted line 20 in drawing 2) 11 prepared in an output channel Ch1 thru/or four output channels of Ch4, respectively is assigned to each output channel module, respectively. Therefore, if each above-mentioned knob formed in each [these] module is operated, the manipulate signal according to this will be sent to CPU2, and CPU2 will transmit the control signal according to the above-mentioned manipulate signal to the signal-processing section 1. And the thing corresponding to each above-mentioned knob is controlled according to the signal-processing information according to the actuation condition of each above-mentioned knob according to the above-mentioned control signal among the signal-processing units 11 surrounded by the above-mentioned each point lines 18, 19, and 20 in the signal-processing section 1. In addition, about the signal-processing unit 11 surrounded by the above-mentioned each point lines 18, 19, and 20, only with each module of a control unit B, it is controllable and control by other control units A, i.e., a control unit, is made impossible.

[0021] in addition, each above-mentioned control units A and B -- it can set up freely whether it is alike,

respectively, it sets and each input channel module assigns control of processing of the signal-processing unit 11 which does not correspond fixed to each signal-processing unit 11 prepared in each input channel, respectively, receives which input channel module, and was prepared in the input channel of a gap. And control of processing of two or more signal-processing units 11 prepared in two or more input channels, respectively can also be assigned to one input channel module, and, thereby, two or more above-mentioned signal-processing units 11 can be controlled by actuation of one input channel module all at once. However, control of processing of one signal-processing unit cannot be assigned to coincidence to both control units A and B, respectively. In addition, about this quota control, it is also the same as when assigning each signal-processing unit 11 prepared in each output channel to each output channel module of each control units A and B. Moreover, the assignment of each signal-processing unit 11 to each [these] module is controlled by the key input from the handler for allocation control which is prepared in each control units A and B, respectively and which is not illustrated, for example, a keyboard, by each control units A and B of every according to an individual, respectively. [0022] And it is controlled by each above-mentioned control units A and B according to an individual, respectively also about ON/OFF control of each switching circuit 15 prepared between each input/output channel assigned to each above-mentioned control units A and B, respectively (between the signal-processing units 11 of each input/output channel). That is, each control units A and B have the handler, for example, the keyboard and touch display which is not illustrated, for controlling ON/OFF of each above-mentioned switching circuit 15 according to an individual, respectively. And the connection / connectionless condition between each input/output channel assigned to each can be switched by operating the above-mentioned keyboard or touch display prepared in each control units A and B, respectively.

[0023] For example, if the above-mentioned keyboard or touch display prepared in the control unit A is operated, the manipulate signal according to this will be sent to CPU2, and CPU2 will transmit the control signal according to this manipulate signal to the signal-processing section 1. And according to the above-mentioned control signal, ON/OFF control of each switching circuit (switching circuit surrounded by the dotted line 21 in drawing 2) 15 which switches the connection / connectionless condition between each input/output channel assigned to this control unit A is carried out [in the signal-processing section 1] according to the so-called initial entry according to the actuation condition of the above-mentioned keyboard or a touch display (handler for switching circuit 15 control). And according to ON/OFF control of each [these] switching circuit 15, the audio signal inputted from each input channel Ch252 thru/or Ch256 will be mixed and distributed, and will be outputted to each output channel Ch31 thru/or Ch32.

[0024] In addition, about each switching circuit 15 surrounded by the above-mentioned each point line 21, only on the above-mentioned keyboard and touch display which were prepared in the control unit A, it is controllable and control by other control units B, i.e., a control unit, is made impossible. Therefore, the input channel Ch253 thru/or Ch256, and the output channels Ch31 and Ch32 which were assigned to this control unit A will be in the condition of having become independent of other input/output channels thoroughly.

[0025] Furthermore, about the output channel Ch31 assigned to the control unit A thru/or Ch32, only on the above-mentioned keyboard and touch display which were prepared in this control unit A, it is supposed that it is controllable so that it can connect with any input channel at arbitration (part surrounded by the dotted line 26 in drawing 2). Thus, by constituting, a monitor can be carried out to arbitration (free) by actuation of the above-mentioned keyboard formed in this control unit A, and a touch display also with the audio signal inputted from the input channel which is not assigned to this control unit A. This is dramatically effective, when the criteria acoustic signal (for example, fixed audio frequency and the sine wave of a constant signal level) is inputted into one of the input channels 252, for example, Ch, and it carries out the monitor of this.

[0026] It is the same as that of the case of the above-mentioned control unit A also about the case where the connection / connectionless condition between each input/output channel assigned to the control unit B are controlled on the other hand. That is, if the above-mentioned keyboard or touch display (handler

for switching circuit 15 control) prepared in the control unit B is operated, the manipulate signal according to this will be sent to CPU2, and CPU2 will transmit the control signal according to this manipulate signal to the signal-processing section 1. And according to the above-mentioned control signal, ON/OFF control of each switching circuit (switching circuit surrounded by dotted lines 22 and 23 in drawing 2) 15 which switches the connection / connectionless condition between each input/output channel assigned to this control unit B is carried out [in the signal-processing section 1] according to the so-called initial entry according to the actuation condition of the above-mentioned keyboard or a touch display. And according to ON/OFF control of each [these] switching circuit 15, the audio signal inputted from each input channel Ch1 Ch4 and Ch33 thru/or Ch36 will be mixed and distributed, and will be outputted to each output channel Ch1 thru/or Ch4.

[0027] In addition, about each switching circuit 15 surrounded by the above-mentioned each point lines 22 and 23, only on the above-mentioned keyboard and touch display which were prepared in the control unit B, it is controllable and control by other control units A, i.e., a control unit, is made impossible. Therefore, the input channel Ch1 assigned to this control unit B Ch4 and Ch33 thru/or 36, and output channels Ch1 and Ch4 will be in the condition of having become independent of other input/output channels thoroughly.

[0028] Furthermore, also with the output channel Ch1 assigned to the control unit B thru/or Ch4, only on the above-mentioned keyboard and touch display which were prepared in this control unit B, it is supposed that it is controllable so that it can connect with any input channel at arbitration (part surrounded by dotted lines 24 and 25 in drawing 2). Thus, by constituting, a monitor can be carried out to arbitration (free) by actuation of the above-mentioned keyboard formed in this control unit B, and a touch display also with the audio signal inputted from the input channel which is not assigned to this control unit B. It is dramatically effective, when it follows, for example, the criteria acoustic signal (for example, fixed audio frequency and the sine wave of a constant signal level) is inputted into one of input channels, for example, Ch5 and Ch32, and Ch37 grade and it carries out the monitor of this.

[0029] As mentioned above, according to the gestalt of this operation, each input/output channel of one set of the signal-processing section 1 is assigned to two sets of control units A and B according to the individual, respectively, and can control processing of the audio signal transmitted in the input/output channel assigned to each by each [these] control units A and B, mixing of each [these] audio signal, and distribution. Namely, it will be in a condition equivalent to two sets of the independent audio mixers having been constituted.

[0030] In two kinds of sound tuning A which is completely unrelated, respectively, for example, studio, as it follows, for example, is shown in drawing 1, each control units A and B can be arranged to studio A and B different, respectively, and, on the other hand, acoustic control of jazz music can be simultaneously carried out in the condition of having become independent about the sound tuning of orchestra, respectively, in Studio B in each studio A and B. Thus, since the input/output channel which the signal-processing section 1 has is controllable by the condition of having become independent by two or more control units, respectively, all the input/output channels that the above-mentioned signal-processing section 1 has can be used for validity. In addition, 3 in drawing 1 and 4 are the patch boards equipped only with the input/output terminal.

[0031] In addition, in the gestalt of this operation, although the case where two sets of control units A and B were prepared to the signal-processing section 1 was explained, further many control units may be prepared.

[0032] Moreover, about whether the number of the input/output channels assigned to each control units A and B and which input/output channel are assigned, it does not restrict above.

[0033] Furthermore, ON/OFF control of each switching circuit 15 surrounded by dotted lines 24, 25, and 26 in drawing 2 may constitute in the condition uncontrollable by neither of the control units.

[0034] And about CPU2 shown in drawing 2, you may build in either of the control units A and B. Furthermore, although the signal-processing section 1 and each control units A and B were considered as the configuration which became independent, respectively, as shown, for example in drawing 3, it is good also as a configuration which stored the signal-processing section 1 and control units A and B in

one case 5.

[0035]

[Effect of the Invention] According to invention according to claim 1, two or more input/output channels which one signal-processing means has are assigned to two or more control units according to the individual, respectively, and can control processing of the audio signal transmitted in the input/output channel assigned to each, mixing of each [these] audio signal, and distribution by each [these] control unit. Namely, it will be in a condition equivalent to two or more audio mixers with which it became independent (in detail only in case of the number of the above-mentioned control units) having been constituted. Therefore, two or more sound tuning which is completely unrelated can be made to carry out simultaneously in the condition of having become independent, respectively, to the above-mentioned signal-processing means. Therefore, even if there is an input/output channel (it is intact) which is not used among the input/output channels which the above-mentioned signal-processing means has, this intact input/output channel can be used for other sound tuning. Namely, unlike the conventional technique mentioned above, it is effective in the ability to use an intact channel effectively. This effectiveness is dramatically effective for the audio mixer of the multi-channel mold which has many input/output channels.

[0036] According to invention according to claim 2, connection between each signal-processing unit assigned to a certain control unit is controlled by other control units, namely, it does not interfere in it. Therefore, the independence of each input/output channel assigned to each control unit improves more.

[0037] According to invention according to claim 3, the audio signal inputted from all input channels to the output channel assigned to this control unit of a certain only by actuation of the handler for connection control prepared in a certain control unit can be made to distribute to arbitration (output). Therefore, in the output channel assigned to each control unit, the monitor of the audio signal inputted from the input channel assigned to other control units can be carried out freely. This is effective, especially when the criteria acoustic signal (for example, fixed audio frequency and the sine wave of a constant signal level) is inputted into one of input channels and it carries out the monitor of this.

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TECHNICAL FIELD

[Field of the Invention] Especially this invention relates to what has the signal-processing section which constitutes an audio mixer, and the control unit which controls this in the condition of having become independent, respectively about an audio mixer.

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PRIOR ART

[Description of the Prior Art] There is a thing as shown in drawing 4 as an audio mixer with which the signal-processing section and a control unit consist of conditions of having become independent, respectively, as mentioned above conventionally. That is, 1 in this drawing minds the signal-processing section, 100 minds a control cable 200 by the control unit, and these signal-processing section 1 and a control unit 100 are connected mutually.

[0003] The internal configuration of the above-mentioned signal-processing section 1 is shown in drawing 5. This signal-processing section 1 is constituted by DSP (digital-signal-processing equipment), and as shown in this drawing (a), it has two or more input/output channels, for example, 256 input channels, and 32 output channels. And the signal-processing unit 11 for adjusting the acoustic feature of the audio signal transmitted in each to each input/output channel is formed. In addition, this signal-processing unit 11 is constituted by the filter 12 for adjusting the frequency characteristics of the above-mentioned audio signal, and the fader 13 for adjusting signal level.

[0004] moreover -- the part with which each input/output channel is divided into a row and column, respectively, and forms the matrix and which each input/output channel intersects -- this drawing (b) -- (-- as shown in this drawing (drawing which expanded the part 14 surrounded by the dotted line in a)), the connecting means 15 which switches between each input/output channel (between the signal-processing units prepared in each input/output channel in detail) to connection or a connectionless condition, respectively, for example, a switching circuit, is established. That is, by carrying out ON/OFF of each [these] switching circuit 15 to arbitration, the audio signal inputted from each above-mentioned input channel can be mixed and distributed to arbitration, and it can output to each above-mentioned output channel.

[0005] On the other hand, the control unit 100 which controls the above-mentioned signal-processing section 1 is equipped with two or more input channel modules 101 and two or more output channel modules 102 as shown in drawing 4. And control of each signal-processing unit 11 (namely, a filter 12 and a fader 13) prepared in each input/output channel of the above-mentioned signal-processing section 1 is assigned to each [these] modules 101 and 102, respectively. That is, the slide knob 104 grade for adjusting the revolution knob 103 for adjusting the frequency characteristics of the above-mentioned filter 12 and the level of the above-mentioned fader 13 to each modules 101 and 102 is prepared. If these knobs 103 and 104 are operated, it will be sent to CPU (central operation processor: not shown) which has a manipulate signal according to this in this control unit 100, and CPU will transmit the control signal according to the above-mentioned manipulate signal to the signal-processing section 1 through a control cable 200. And each filter 12 and each fader 13 corresponding to each above-mentioned knobs 103 and 104 are controlled [in the signal-processing section 1] according to the signal-processing information according to the actuation condition of each above-mentioned knobs 103 and 104 according to the above-mentioned control signal. Thereby, adjustment of the frequency characteristics of the audio signal transmitted in each input/output channel and signal level is realized.

[0006] In addition, it can set up freely whether each above-mentioned input channel module 101 assigns control of processing of the signal-processing unit 11 which does not correspond fixed to each signal-

processing unit 11 prepared in each input channel of the signal-processing section 1, respectively, receives which input channel module 101, and was prepared in the input channel of a gap. And control of processing of two or more signal-processing units 11 prepared in two or more input channels, respectively can also be assigned to one input channel module 101, and, thereby, two or more above-mentioned signal-processing units 11 can be controlled by actuation of one input channel module 101 all at once. In addition, about this quota control, it is also the same as when assigning each signal-processing unit 11 of each output channel to each output channel module 102. Moreover, the assignment of each signal-processing unit 11 to each [these] modules 101 and 102 is controlled by the key input from the handler for allocation control which is prepared in the control unit 100 and which is not illustrated, for example, a keyboard.

[0007] and ON/OFF control of each switching circuit 15 prepared between each input/output channel in the signal-processing section 1 (between the signal-processing units 11 of each input/output channel) -- getting it blocked -- it is controlled by the control unit 100 also about how between each signal-processing unit 11 is connected. That is, the handler, for example, a keyboard, a touch display, etc. which is not illustrated, for each switching circuit 15 above-mentioned control etc. are prepared in the control unit 100. If this keyboard or a touch display is operated, it will be sent to CPU which the manipulate signal according to this mentioned above, and CPU will transmit the control signal according to this manipulate signal to the signal-processing section 1 through a control cable 200. And according to the above-mentioned control signal, ON/OFF control of each above-mentioned switching circuit 15 is carried out [in the signal-processing section 1] according to the so-called initial entry according to the actuation condition of the above-mentioned keyboard or a touch display. And according to ON/OFF control of each of this switching circuit 15, the audio signal inputted from each input channel will be mixed and distributed, and will be outputted to each output channel.

[Translation done.]

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EFFECT OF THE INVENTION

[Effect of the Invention] According to invention according to claim 1, two or more input/output channels which one signal-processing means has are assigned to two or more control units according to the individual, respectively, and can control processing of the audio signal transmitted in the input/output channel assigned to each, mixing of each [these] audio signal, and distribution by each [these] control unit. Namely, it will be in a condition equivalent to two or more audio mixers with which it became independent (in detail only in case of the number of the above-mentioned control units) having been constituted. Therefore, two or more sound tuning which is completely unrelated can be made to carry out simultaneously in the condition of having become independent, respectively, to the above-mentioned signal-processing means. Therefore, even if there is an input/output channel (it is intact) which is not used among the input/output channels which the above-mentioned signal-processing means has, this intact input/output channel can be used for other sound tuning. Namely, unlike the conventional technique mentioned above, it is effective in the ability to use an intact channel effectively. This effectiveness is dramatically effective for the audio mixer of the multi-channel mold which has many input/output channels.

[0036] According to invention according to claim 2, connection between each signal-processing unit assigned to a certain control unit is controlled by other control units, namely, it does not interfere in it. Therefore, the independence of each input/output channel assigned to each control unit improves more.

[0037] According to invention according to claim 3, the audio signal inputted from all input channels to the output channel assigned to this control unit of a certain only by actuation of the handler for connection control prepared in a certain control unit can be made to distribute to arbitration (output). Therefore, in the output channel assigned to each control unit, the monitor of the audio signal inputted from the input channel assigned to other control units can be carried out freely. This is effective, especially when the criteria acoustic signal (for example, fixed audio frequency and the sine wave of a constant signal level) is inputted into one of input channels and it carries out the monitor of this.

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TECHNICAL PROBLEM

[Problem(s) to be Solved by the Invention] The so-called multi-channel type which has the above numbers of input channels of no less than 256 channels and the number of output channels of no less than 32 channels of audio mixer is installed in the place which does a complicated very large-scale and acoustic control activity like a broadcasting station or recording studio. However, in the usual acoustic control activity, it is dramatically rare to need such a number of input channels of no less than 256 channels and the number of output channels of no less than 32 channels (namely, thing handling the input signal of 256, and the output signal of 32), and in almost all cases, 32 thru/or 64 channels, and an output channel can fully cope with it, if the number of input channels has 4 thru/or no less than eight channels. Therefore, when it is a superfluous specification and this audio mixer is used for the usual acoustic control activity to the usual acoustic control activity, the above-mentioned audio mixer will be in the condition (it played) that very many input/output channels are not used, and will have the problem of being very uneconomical. so that the number of input/output channels of an audio mixer [especially] increases -- being expensive (high-class) -- since it becomes, it is dramatically useless to keep many input/output channels idle as mentioned above.

[0009] This invention aims at offering the audio mixer which can be used effectively by making controllable independently each above-mentioned input/output channel which prepared two or more control units, and assigned an input/output channel which is different in each [these] control unit, respectively according to the individual, and the above signal-processing sections 1 of a multi-channel mold were assigned by each control unit at each, without keeping each above-mentioned input/output channel idle as much as possible.

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MEANS

[Means for Solving the Problem] In order to attain the object mentioned above, among this inventions invention according to claim 1 Two or more input channels, two or more output channels, and two or more signal-processing units that process the audio signal which is prepared for each [these] input/output channel of every, and is transmitted in each according to signal-processing information, The connecting means which connects between the signal-processing units of these plurality according to an initial entry, respectively, Control of processing of each above-mentioned signal-processing unit different, respectively from a preparation ***** means is assigned. The handler for signal-processing control which generates the above-mentioned signal-processing information which controls processing of each above-mentioned signal-processing unit assigned to each according to an actuation condition, It is characterized by providing two or more control units equipped with the handler for connection control which generates the above-mentioned initial entry which controls connection between each above-mentioned signal-processing unit assigned to each according to an actuation condition.

[0011] That is, to one signal-processing means, two or more control units are prepared and control of processing of the signal-processing unit prepared in an input/output channel which is different, respectively among two or more input/output channels which the above-mentioned signal-processing means has is assigned to each [these] control unit. If the handler for signal-processing control with which each control unit was equipped is operated, according to this actuation condition, the signal-processing (it corresponds) unit assigned to this operated control unit will be controlled, and the audio signal transmitted in the input/output channel assigned to the above-mentioned control unit by this will be processed. Processing of this audio signal is not controlled by any control units other than the above-mentioned control unit assigned to this (namely, other control units). Moreover, if the handler for connection control with which each control unit was equipped is operated, according to this actuation condition, between the signal-processing units of each (it corresponds) input/output channel assigned to this operated control unit will be connected, and it will be outputted to the output channel by which the audio signal transmitted in the input channel assigned to the above-mentioned control unit by this was mixed and distributed, and was assigned to the above-mentioned control unit.

[0012] Invention according to claim 2 is characterized by it being presupposed by only the handler for the above-mentioned connection control with which the control unit of the above-mentioned identitas was equipped that it is controllable in an audio mixer according to claim 1 about connection between each above-mentioned signal-processing unit assigned to the respectively same control unit.

[0013] That is, about connection between each signal-processing unit assigned to a certain control unit, it is not controlled by other control units.

[0014] Invention according to claim 3 is set to an audio mixer according to claim 1 or 2. About the signal-processing unit prepared in the above-mentioned output channel among each above-mentioned signal-processing unit assigned to each above-mentioned control unit It is characterized by supposing that it is controllable in the condition connectable [with the handler for the above-mentioned connection control with which the above-mentioned control unit to which control of processing of this signal-

processing unit is assigned was equipped] with the signal-processing unit prepared in which input channel at arbitration.

[0015] That is, the audio signal inputted from all input channels to the output channel which has the signal-processing unit assigned to this control unit of a certain by actuation of the handler for connection control prepared in a certain control unit can be made to distribute to arbitration (output). In addition, about distribution of this audio signal, it is uncontrollable depending on other control units.

[0016]

[Embodiment of the Invention] About the gestalt of operation of the audio mixer concerning this invention, the example is explained with reference to drawing 3 from drawing 1. Drawing 1 is the block diagram showing the outline configuration of the whole audio mixer concerning the gestalt of this operation. As shown in this drawing, to one set of the signal-processing section 1, this audio mixer connects Plurality (two sets of for example, control units) A and B according to an individual through a control section 2, for example, CPU, respectively, and it constitutes them so that the above-mentioned signal-processing section 1 may be controlled by each control units A and B. In addition, since it is equivalent to the thing of the conventional technique shown in drawing 5 which the internal configuration mentioned above about the above-mentioned signal-processing section 1 as shown in drawing 2, in the gestalt of this operation, the detailed explanation about the structure of the above-mentioned signal-processing section 1 is omitted.

[0017] namely, each control units A and B like the conventional control unit 100 shown in drawing 4 mentioned above Two or more input channel module and two or more output channel modules (to each [these] module) for adjusting each signal-processing unit 11 (each filter 12 and each fader 13) of the above-mentioned signal-processing section 1, respectively which are not illustrated the revolution knob for adjusting the frequency characteristics of the above-mentioned filter 12, the slide knob (neither is illustrated) for adjusting the level of the above-mentioned fader 13, etc. are formed. It has. However, an input/output channel which is different, respectively among two or more input/output channels which the signal-processing section 1 has is assigned to each [these] control units A and B. To a control unit A, for example, an input channel Ch253 thru/or four input channels of Ch256, output channels Ch31, or two output channels of Ch32 On the other hand, an input channel Ch1 Ch4 and Ch33 thru/or a total of eight input channels of Ch36, output channels Ch1, or four output channels of Ch4 are assigned to the control unit B, respectively.

[0018] And control of each signal-processing unit 11 of each input/output channel assigned to each above-mentioned control units A and B, respectively is further assigned to each module of each control units A and B.

[0019] namely, to each input channel module of a control unit A Control of processing of the signal-processing unit (each signal-processing unit surrounded by the dotted line 16 in drawing 2) 11 prepared in an input channel Ch253 thru/or four input channels of Ch256, respectively Moreover, control of processing of the signal-processing unit (each signal-processing unit surrounded by the dotted line 17 in drawing 2) 11 prepared in an output channel Ch31 thru/or two output channels of Ch32, respectively is assigned to each output channel module, respectively. Therefore, if each above-mentioned knob formed in each [these] module is operated, the manipulate signal according to this will be sent to CPU2, and CPU2 will transmit the control signal according to the above-mentioned manipulate signal to the signal-processing section 1. And the thing corresponding to each above-mentioned knob is controlled according to the signal-processing information according to the actuation condition of each above-mentioned knob according to the above-mentioned control signal among the signal-processing units 11 surrounded by the above-mentioned each point lines 16 and 17 in the signal-processing section 1. In addition, about the signal-processing unit 11 surrounded by the above-mentioned each point lines 16 and 17, only with each module of a control unit A, it is controllable and control by other control units B, i.e., a control unit, is made impossible.

[0020] On the other hand, to each input channel module of a control unit B Control of processing of the signal-processing unit (each signal-processing unit surrounded by dotted lines 18 and 19 in drawing 2) 11 prepared in an input channel Ch1 Ch4 and Ch33 thru/or a total of eight input channels of Ch36,

respectively Moreover, control of processing of the signal-processing unit (each signal-processing unit surrounded by the dotted line 20 in drawing 2) 11 prepared in an output channel Ch1 thru/or four output channels of Ch4, respectively is assigned to each output channel module, respectively. Therefore, if each above-mentioned knob formed in each [these] module is operated, the manipulate signal according to this will be sent to CPU2, and CPU2 will transmit the control signal according to the above-mentioned manipulate signal to the signal-processing section 1. And the thing corresponding to each above-mentioned knob is controlled according to the signal-processing information according to the actuation condition of each above-mentioned knob according to the above-mentioned control signal among the signal-processing units 11 surrounded by the above-mentioned each point lines 18, 19, and 20 in the signal-processing section 1. In addition, about the signal-processing unit 11 surrounded by the above-mentioned each point lines 18, 19, and 20, only with each module of a control unit B, it is controllable and control by other control units A, i.e., a control unit, is made impossible.

[0021] in addition, each above-mentioned control units A and B -- it can set up freely whether it is alike, respectively, it sets and each input channel module assigns control of processing of the signal-processing unit 11 which does not correspond fixed to each signal-processing unit 11 prepared in each input channel, respectively, receives which input channel module, and was prepared in the input channel of a gap. And control of processing of two or more signal-processing units 11 prepared in two or more input channels, respectively can also be assigned to one input channel module, and, thereby, two or more above-mentioned signal-processing units 11 can be controlled by actuation of one input channel module all at once. However, control of processing of one signal-processing unit cannot be assigned to coincidence to both control units A and B, respectively. In addition, about this quota control, it is also the same as when assigning each signal-processing unit 11 prepared in each output channel to each output channel module of each control units A and B. Moreover, the assignment of each signal-processing unit 11 to each [these] module is controlled by the key input from the handler for allocation control which is prepared in each control units A and B, respectively and which is not illustrated, for example, a keyboard, by each control units A and B of every according to an individual, respectively.

[0022] And it is controlled by each above-mentioned control units A and B according to an individual, respectively also about ON/OFF control of each switching circuit 15 prepared between each input/output channel assigned to each above-mentioned control units A and B, respectively (between the signal-processing units 11 of each input/output channel). That is, each control units A and B have the handler, for example, the keyboard and touch display which is not illustrated, for controlling ON/OFF of each above-mentioned switching circuit 15 according to an individual, respectively. And the connection / connectionless condition between each input/output channel assigned to each can be switched by operating the above-mentioned keyboard or touch display prepared in each control units A and B, respectively.

[0023] For example, if the above-mentioned keyboard or touch display prepared in the control unit A is operated, the manipulate signal according to this will be sent to CPU2, and CPU2 will transmit the control signal according to this manipulate signal to the signal-processing section 1. And according to the above-mentioned control signal, ON/OFF control of each switching circuit (switching circuit surrounded by the dotted line 21 in drawing 2) 15 which switches the connection / connectionless condition between each input/output channel assigned to this control unit A is carried out [in the signal-processing section 1] according to the so-called initial entry according to the actuation condition of the above-mentioned keyboard or a touch display (handler for switching circuit 15 control). And according to ON/OFF control of each [these] switching circuit 15, the audio signal inputted from each input channel Ch252 thru/or Ch256 will be mixed and distributed, and will be outputted to each output channel Ch31 thru/or Ch32.

[0024] In addition, about each switching circuit 15 surrounded by the above-mentioned each point line 21, only on the above-mentioned keyboard and touch display which were prepared in the control unit A, it is controllable and control by other control units B, i.e., a control unit, is made impossible. Therefore, the input channel Ch253 thru/or Ch256, and the output channels Ch31 and Ch32 which were assigned to this control unit A will be in the condition of having become independent of other input/output channels

thoroughly.

[0025] Furthermore, about the output channel Ch31 assigned to the control unit A thru/or Ch32, only on the above-mentioned keyboard and touch display which were prepared in this control unit A, it is supposed that it is controllable so that it can connect with any input channel at arbitration (part surrounded by the dotted line 26 in drawing 2). Thus, by constituting, a monitor can be carried out to arbitration (free) by actuation of the above-mentioned keyboard formed in this control unit A, and a touch display also with the audio signal inputted from the input channel which is not assigned to this control unit A. This is dramatically effective, when the criteria acoustic signal (for example, fixed audio frequency and the sine wave of a constant signal level) is inputted into one of the input channels 252, for example, Ch, and it carries out the monitor of this.

[0026] It is the same as that of the case of the above-mentioned control unit A also about the case where the connection / connectionless condition between each input/output channel assigned to the control unit B are controlled on the other hand. That is, if the above-mentioned keyboard or touch display (handler for switching circuit 15 control) prepared in the control unit B is operated, the manipulate signal according to this will be sent to CPU2, and CPU2 will transmit the control signal according to this manipulate signal to the signal-processing section 1. And according to the above-mentioned control signal, ON/OFF control of each switching circuit (switching circuit surrounded by dotted lines 22 and 23 in drawing 2) 15 which switches the connection / connectionless condition between each input/output channel assigned to this control unit B is carried out [in the signal-processing section 1] according to the so-called initial entry according to the actuation condition of the above-mentioned keyboard or a touch display. And according to ON/OFF control of each [these] switching circuit 15, the audio signal inputted from each input channel Ch1 Ch4 and Ch33 thru/or Ch36 will be mixed and distributed, and will be outputted to each output channel Ch1 thru/or Ch4.

[0027] In addition, about each switching circuit 15 surrounded by the above-mentioned each point lines 22 and 23, only on the above-mentioned keyboard and touch display which were prepared in the control unit B, it is controllable and control by other control units A, i.e., a control unit, is made impossible. Therefore, the input channel Ch1 assigned to this control unit B Ch4 and Ch33 thru/or 36, and output channels Ch1 and Ch4 will be in the condition of having become independent of other input/output channels thoroughly.

[0028] Furthermore, also with the output channel Ch1 assigned to the control unit B thru/or Ch4, only on the above-mentioned keyboard and touch display which were prepared in this control unit B, it is supposed that it is controllable so that it can connect with any input channel at arbitration (part surrounded by dotted lines 24 and 25 in drawing 2). Thus, by constituting, a monitor can be carried out to arbitration (free) by actuation of the above-mentioned keyboard formed in this control unit B, and a touch display also with the audio signal inputted from the input channel which is not assigned to this control unit B. It is dramatically effective, when it follows, for example, the criteria acoustic signal (for example, fixed audio frequency and the sine wave of a constant signal level) is inputted into one of input channels, for example, Ch5 and Ch32, and Ch37 grade and it carries out the monitor of this.

[0029] As mentioned above, according to the gestalt of this operation, each input/output channel of one set of the signal-processing section 1 is assigned to two sets of control units A and B according to the individual, respectively, and can control processing of the audio signal transmitted in the input/output channel assigned to each by each [these] control units A and B, mixing of each [these] audio signal, and distribution. Namely, it will be in a condition equivalent to two sets of the independent audio mixers having been constituted.

[0030] In two kinds of sound tuning A which is completely unrelated, respectively, for example, studio, as it follows, for example, is shown in drawing 1 , each control units A and B can be arranged to studio A and B different, respectively, and, on the other hand, acoustic control of jazz music can be simultaneously carried out in the condition of having become independent about the sound tuning of orchestra, respectively, in Studio B in each studio A and B. Thus, since the input/output channel which the signal-processing section 1 has is controllable by the condition of having become independent by two or more control units, respectively, all the input/output channels that the above-mentioned signal-

processing section 1 has can be used for validity. In addition, 3 in drawing 1 and 4 are the patch boards equipped only with the input/output terminal.

[0031] In addition, in the gestalt of this operation, although the case where two sets of control units A and B were prepared to the signal-processing section 1 was explained, further many control units may be prepared.

[0032] Moreover, about whether the number of the input/output channels assigned to each control units A and B and which input/output channel are assigned, it does not restrict above.

[0033] Furthermore, ON/OFF control of each switching circuit 15 surrounded by dotted lines 24, 25, and 26 in drawing 2 may constitute in the condition uncontrollable by neither of the control units.

[0034] And about CPU2 shown in drawing 2 , you may build in either of the control units A and B. Furthermore, although the signal-processing section 1 and each control units A and B were considered as the configuration which became independent, respectively, as shown, for example in drawing 3 , it is good also as a configuration which stored the signal-processing section 1 and control units A and B in one case 5.

[Translation done.]

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DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]

[Drawing 1] It is drawing showing the gestalt of operation of the audio mixer concerning this invention, and is the block diagram showing the whole outline configuration.

[Drawing 2] It is internal configuration drawing of the signal-processing section in the gestalt of this operation.

[Drawing 3] In the gestalt of this operation, it is the perspective view showing the condition of having stored the signal-processing section and a control unit in one case.

[Drawing 4] It is the outline block diagram of the conventional audio mixer.

[Drawing 5] It is drawing showing the signal-processing section of the conventional audio mixer, and (a) is the internal configuration drawing and (b) is drawing which expanded the part surrounded by the dotted line 14 of (a), and was expressed equivalent.

[Description of Notations]

1 Signal-Processing Section (DSP: Signal-Processing Means)

2 CPU

11 Signal-Processing Unit

15 Switching Circuit (Connecting Means)

[Translation done.]

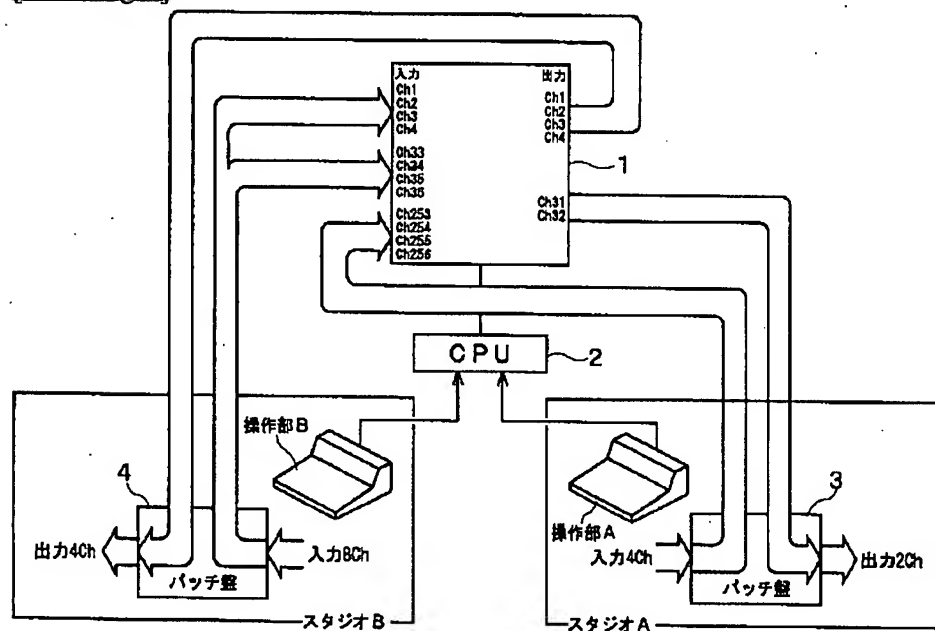
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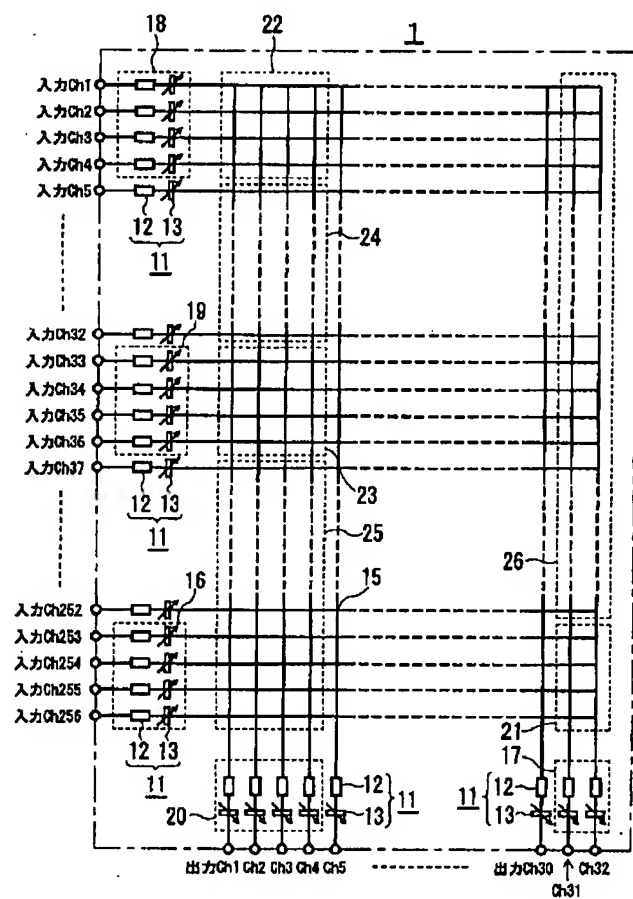
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DRAWINGS

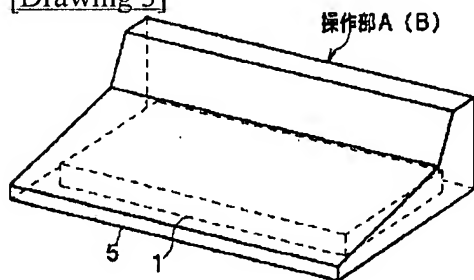
[Drawing 1]



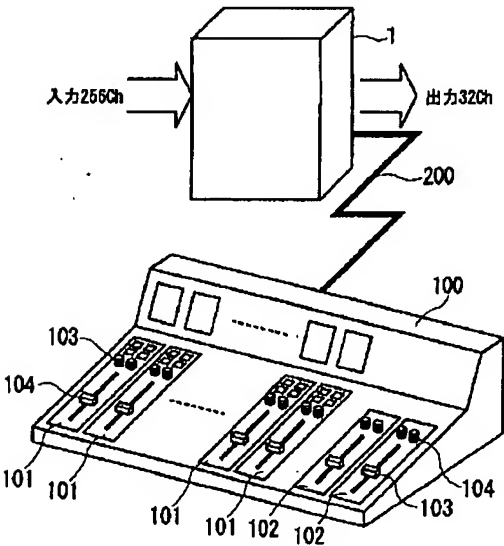
[Drawing 2]



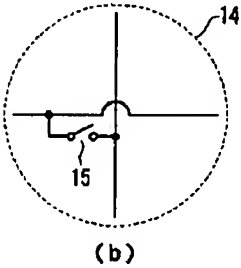
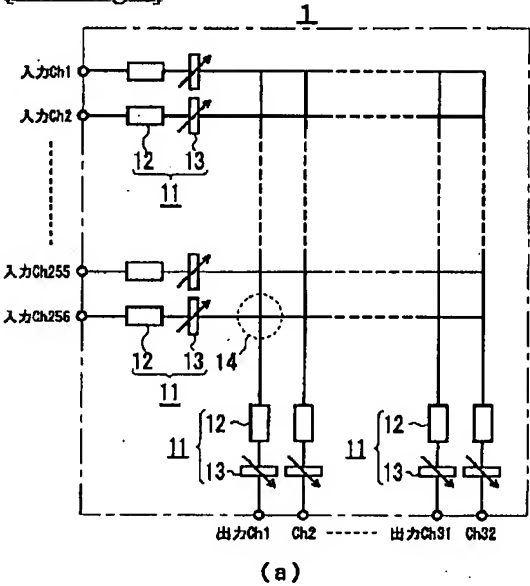
[Drawing 3]



[Drawing 4]



[Drawing 5]



[Translation done.]